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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/652,489	09/02/2003	In-Su Hwang	1349.1259	2307
21171	7590	06/22/2005	EXAMINER	
STAAS & HALSEY LLP SUITE 700 1201 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005			MRUK, GEOFFREY S	
			ART UNIT	PAPER NUMBER
			2853	

DATE MAILED: 06/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/652,489

Applicant(s)

HWANG, IN-SU

Examiner

Geoffrey Mruk

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 April 2005.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-16 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 02 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Objections*

Claim 1 is objected to because of the following informalities: Claim 1 states "a supporting member disposed at a predetermined position to detect when the ink level is decreased below a predetermined level". The supporting member does not detect the ink level. In light of the specification, the photo detector detects light emitted from the self-luminous member when the ink in the ink tank is lower than a predetermined level.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1, 2, 5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. (US 5,689,290) in view of Chuang et al. (US 5,708,957).

With respect to claim 1, the primary reference of Saito discloses an ink-detecting device (Fig. 3) of an inkjet printer (Fig. 1), comprising:

- an ink tank (Fig. 3, element 11) comprising a predetermined amount of ink (Column 5, lines 32-48);

- a supporting member disposed at a predetermined position to detect an ink level and to detect when the ink level is decreased below a predetermined level.

Although the supporting member is not disclosed to support the light emitting diode (Fig. 3, element 34), this supporting member would necessarily be present to hold the light emitting diode.

- a luminous member (Fig. 3, element 34) comprising a self-luminous material and supported by the supporting member, and
- a photo detector (Fig. 3, element 35) to detect a light (Fig. 3, element C) emitted from the luminous member when the ink level in the ink tank is lower than the predetermined level.

With respect to claim 2, the primary reference of Saito discloses a transparent window (Fig. 3, elements 30 and 31) disposed at a corresponding position of the supporting member to pass the light (Fig. 3, element C) from the luminous member (Fig. 3, element 34), wherein the photo detector detects (Fig. 3, element 35) the light passed through the transparent window.

With respect to claim 5, the primary reference of Saito discloses the supporting member is disposed at a sidewall (Fig. 3, element 22) of the ink tank (Fig. 3, element 11). Although the supporting member is not disclosed to support the light emitting diode (Fig. 3, element 34), this supporting member would necessarily be present to hold the light emitting diode.

With respect to claim 6, the primary reference of Saito discloses the supporting member is disposed at a bottom (Fig. 3, element 22) of the ink tank (Fig. 3, element 11).

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Since the diode (Fig. 3, element 34) is disposed at a bottom of the tank, the support for the diode would necessarily be present at the bottom of the tank.

However, Saito fails to teach the luminous member is capable of emitting light without using a powered light source.

The secondary reference of Chuang discloses "an optical sensor is provided with a self-powered light source by the use of a radio luminescent material which includes a radioactive beta emitter constituent and a phosphor constituent energized by beta particles from the radioactive constituent to emit light. By appropriate selection of the phosphor compound, the wavelength of light produced by the radio luminescent source may be matched to a corresponding sensing matrix to optimally configure the sensor for the detection of a particular substance of interest" (Column 2, lines 29-39).

Therefore, in view of the teachings of the secondary reference, one of ordinary skill in the art would have been motivated to modify the primary reference by using the self-powered light source of Chuang in the liquid level detecting mechanism of Saito. The motivation for doing so would have been "to provide an optical sensing system with a self-powered light source having improved power efficiency, reliability, and long term operability" (Column 2, lines 58-60).

2. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. (US 5,689,290) in view of Chuang et al. (US 5,708,957) as applied to claims 1, 2, 5, and 6 above, and further in view of Kitagawa et al. (US 6,264,855 B1).

Saito and Chuang references disclose all of the limitations of the ink-detecting device of an inkjet printer except:

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- the luminous member is a luminous paper and
- the luminous member is a luminous paint.

Kitagawa discloses a water resistant luminous pigment where "this pigment is homogeneously dispersed in each kind of ink vehicle, paint vehicle or the like to give a luminous ink or a luminous paint. Using this ink or paint, luminous patterns, letters, figures or the like can be formed or further a luminous paint membrane can be applied toward molded products such as paper, monofilament or multifilament fibers, knitted or woven fabric, nonwoven fabric, synthetic resin film, synthetic resin molded product, glass molded product, ceramics molded product, leather molded product, metal molded product, wood molded product or the like by a printing method such as a gravure, offset, screen or tampo printings, or by a coating method such as a brush painting, hazing painting, dipping, roll coating, knife coating, shower coating or spray coating" (Column 6, lines 42-57).

Therefore, in view of the teachings of the tertiary reference, one of ordinary skill in the art would have been motivated to modify the primary reference by using the water resistant luminous pigment of Kitagawa in the liquid level detecting mechanism of Saito. The motivation for doing so would have been "it is a luminous pigment able to emit light in a dark place for long time and also has a very excellent water resistance" (Column 6, lines 36-38).

3. Claims 7 and 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. (US 5,689,290) in view of Chuang et al. (US 5,708,957).

With respect to claim 7, the primary reference of Saito discloses an inkjet printer (Fig. 1) comprising an ink level-detecting device (Fig. 3), the inkjet printer comprising:

- a photo detector (Fig. 3, element 35); and
- an ink level detecting device detecting an amount of residual ink in the printer using the photo detector (Column 5, lines 32-48), and
- comprising a luminous member (Fig. 3, element 34) to detect when a level of ink is lower than a predetermined level during a printing operation.

With respect to claim 10, the primary reference of Saito discloses the ink level-detecting device (Fig. 3) comprises:

- an ink tank (Fig. 3, element 11) comprising a liquid carrier and a toner used as a developer for the inkjet printer. The toner would necessarily be present in the liquid carrier since ink has carrier and colorant (Column 1, lines 58-59).
- a supporting member disposed at a sidewall of the ink tank to detect when the ink is low. Although the supporting member is not disclosed to support the light emitting diode (Fig.3, element 34), this supporting member would necessarily be present to hold the light emitting diode.
- a transparent window (Fig. 3, elements 30 and 31) passing a light (Fig. 3, element C) from the luminous member and disposed at a bottom of the ink tank. Although the supporting member is not disclosed to support the light emitting diode (Fig.3, element 34), this supporting member would necessarily be present to hold the light emitting diode.

- a photo detector (Fig. 3, element 35) detecting the light from the luminous member.

With respect to claim 11, the primary reference of Saito discloses "When the ink level 27 (ink level 26) is above the transparent windows 30, 31, the light ray C will pass through the ink (e.g., black ink), resulting in a smaller quantity of light reaching the phototransistor (light receiving means) 35" (Column 5, lines 32-47). Applicant's claimed invention specifies that when the container is not empty, the sensor cannot detect any light passing through the ink. Saito teaches that a certain amount of light is needed to trigger the phototransistor. Therefore, Saito renders obvious the claimed invention, since light needed to trigger the phototransistor is equivalent to the claimed "detecting" mechanism.

With respect to claim 12, the primary reference of Saito discloses when the tank is not full, the ink level is under the transparent window and the light emitted from the luminous member passes through the transparent window (Column 5, lines 32-47).

With respect to claim 13, the primary reference of Saito discloses the ink level-detecting device comprises:

- an ink tank (Fig. 3, element 11) comprising a liquid carrier and a toner used as a developer for the inkjet printer. The toner would necessarily be present in the liquid carrier since ink has carrier and colorant (Column 1, lines 58-59).
- a supporting member disposed at the bottom of the ink tank to detect when the ink is low. Although the supporting member is not disclosed to support the light



emitting diode (Fig.3, element 34), this supporting member would necessarily be present to hold the light emitting diode.

- a transparent window (Fig. 3, elements 30 and 31) passing a light (Fig. 3, element C) from the luminous member (Fig. 3, element 34 ) and disposed at a sidewall of the ink tank, and
- a photo detector (Fig. 3, element 35) detecting the light from the luminous member.

However, Saito fails to teach the luminous member comprises a self-luminous material.

The secondary reference of Chuang discloses "an optical sensor is provided with a self-powered light source by the use of a radio luminescent material which includes a radioactive beta emitter constituent and a phosphor constituent energized by beta particles from the radioactive constituent to emit light. By appropriate selection of the phosphor compound, the wavelength of light produced by the radio luminescent source may be matched to a corresponding sensing matrix to optimally configure the sensor for the detection of a particular substance of interest" (Column 2, lines 29-39).

Therefore, in view of the teachings of the secondary reference, one of ordinary skill in the art would have been motivated to modify the primary reference by using the self-powered light source of Chuang in the liquid level detecting mechanism of Saito. The motivation for doing so would have been "to provide an optical sensing system with a self-powered light source having improved power efficiency, reliability, and long term operability" (Column 2, lines 58-60).

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4. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. (US 5,689,290) in view of Chuang et al. (US 5,708,957) as applied to claims 7 and 10-13 above, and further in view of Denton et al. (US 6,293,143 B1).

Saito and Chuang references disclose all of the limitations of the ink-detecting device of an inkjet printer except:

- a controller controlling operations of the inkjet printer and outputting a signal indicative that the level of ink is lower than the predetermined level to an output device and
- the output device comprises a display.

Denton discloses "a digital signal is generated as a result of the output change and is relayed to the printer control to signal a low ink level alarm. The alarm may be an audible signal, a visible signal, a message displayed on a computer monitor or a combination of signals and/or messages. In the alternative, the digital signal generated by the photo sensor 38 may also be used to terminate printing operations upon activation of the low level alarm" (column 4, lines 56-65).

Therefore, in view of the teachings of the tertiary reference, one of ordinary skill in the art would have been motivated to modify the primary reference by using the display indications for low ink level of Denton in the liquid level detecting mechanism of Saito . The motivation for doing so would have been to easily alert a user of the printer when the liquid level within the ink tank is low.

5. Claims 14, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. (US 5,689,290) in view of Chuang et al. (US 5,708,957).

With respect to claim 14, the primary reference of Saito discloses an ink-detecting device (Fig. 3) of an inkjet printer (Fig. 1) , comprising: a luminous member (Fig. 3, element 34) to detect when a level of ink is lower than a predetermined level during a printing operation (Column 5, lines 32-48).

With respect to claim 16, the primary reference of Saito discloses an ink-detecting device of an inkjet printer, comprising: a luminous member to detect a level of ink.

However, Saito fails to teach the luminous member is capable of emitting light without using a powered light source.

The secondary reference of Chuang discloses "an optical sensor is provided with a self-powered light source by the use of a radio luminescent material which includes a radioactive beta emitter constituent and a phosphor constituent energized by beta particles from the radioactive constituent to emit light. By appropriate selection of the phosphor compound, the wavelength of light produced by the radio luminescent source may be matched to a corresponding sensing matrix to optimally configure the sensor for the detection of a particular substance of interest" (Column 2, lines 29-39).

Therefore, in view of the teachings of the secondary reference, one of ordinary skill in the art would have been motivated to modify the primary reference by using the self-powered light source of Chuang in the liquid level detecting mechanism of Saito. The motivation for doing so would have been "to provide an optical sensing system with a self-powered light source having improved power efficiency, reliability, and long term operability" (Column 2, lines 58-60).

6. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. (US 5,689,290) in view of Chuang et al. (US 5,708,957) as applied to claims 1, 2, 5, and 6 above, and further in view of Kitagawa et al. (US 6,264,855 B1).

Saito and Chuang references disclose all of the limitations of the ink-detecting device of an inkjet printer except: the luminous member is a luminous paper.

Kitagawa discloses a water resistant luminous pigment where "this pigment is homogeneously dispersed in each kind of ink vehicle, paint vehicle or the like to give a luminous ink or a luminous paint. Using this ink or paint, luminous patterns, letters, figures or the like can be formed or further a luminous paint membrane can be applied toward molded products such as paper, monofilament or multifilament fibers, knitted or woven fabric, nonwoven fabric, synthetic resin film, synthetic resin molded product, glass molded product, ceramics molded product, leather molded product, metal molded product, wood molded product or the like by a printing method such as a gravure, offset, screen or tampo printings, or by a coating method such as a brush painting, hazing painting, dipping, roll coating, knife coating, shower coating or spray coating" (Column 6, lines 42-57).

Therefore, in view of the teachings of the tertiary reference, one of ordinary skill in the art would have been motivated to modify the primary reference by using the water resistant luminous pigment of Kitagawa in the liquid level detecting mechanism of Saito. The motivation for doing so would have been "it is a luminous pigment able to emit light in a dark place for long time and also has a very excellent water resistance" (Column 6, lines 36-38).

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Geoffrey Mruk whose telephone number is (571) 272-2810. The examiner can normally be reached on 7am - 330pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

GSM  
6/14/2005



**MANISH S. SHAH**  
**PRIMARY EXAMINER**